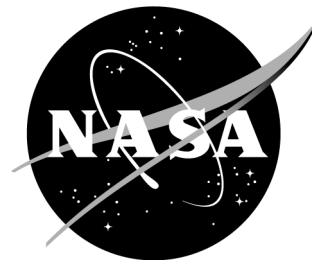


# NewsRelease

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**Langley Research Center**  
Hampton, Va. 23681-2199



Chris Rink/Julia Cole  
(Phone: 757/864-6786/4052)

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## **CLOUDS SHIELD POLLUTANTS GOING OUT TO SEA**

NASA scientists have the first evidence more regional pollution lurks in clouds than in clear skies off the Asian coastline. This finding has implications for space-based attempts to monitor global pollution and for other populated regions around the world.

Scientists estimate that roughly two-thirds of Asian pollution from the Pacific Rim flows to the western, North Pacific Ocean under cloudy conditions. They based the study on direct measurements taken in and around clouds by aircraft instruments during the Transport and Chemical Evolution over the Pacific (TRACE-P) field experiment.

"The idea that clouds can be associated with pollution transport is not new, but the TRACE-P observations provide the first evidence of a cloud-pollution link over a large region," said Jim Crawford, the TRACE-P deputy mission scientist at NASA Langley Research Center.

Scientists measured 32 percent more carbon monoxide, an indicator of pollution, in cloudy regions of the lower atmosphere (troposphere) and 15 percent more in the upper troposphere as compared to pollution levels in clear skies. Scientists also found a similar relationship between clouds and other pollutants such as the greenhouse gases carbon dioxide and methane.

"Larger concentrations of pollution are being transported away from Asia under the cover of clouds than we expected," Crawford said. "This information is critical for interpreting pollution measurements from space."

The scientists think clouds could mask pollution from spacecraft sensors, so current predictions based on satellite observations alone could underestimate pollution levels. Researchers say they will need additional information from field studies that combine observations from satellites, aircraft and ground stations to determine the extent that clouds impact spacecraft-based measurements. The *Journal of Geophysical Research-Atmospheres* recently published a paper on the study.

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Although the Asian-Pacific region was the focus of the study, scientists believe the relationship between clouds and pollution could also exist downstream from other populated regions of the world. The North American-North Atlantic and the African-South Atlantic regions are examples of areas where people can contribute to regional pollution.

Human activities, such as the burning of fossil fuels for household heating and industrial uses, and the burning of vegetation, called biomass burning, produce air pollution. Cold air masses or cold fronts flow eastward across Asia and lift the warm, polluted air mass in front of them.

The lifting caused by cold fronts, which are dominant during the springtime in Asia, induce cloud formation in the warm air mass. Thus the mechanism for cloud formation and the export of pollution is the same, leading to a link between clouds and pollution.

NASA's Earth Science Enterprise funded this research in an effort to better understand and protect our home planet. TRACE-P, conducted from March to April 2001, is part of the long series of NASA Global Troposphere Experiments (GTE). The aim of GTE is to develop a better understanding of worldwide chemistry of the troposphere and to provide information that will allow scientists to more accurately understand how to use satellite observations for global air quality studies.

For information about this research on the Internet, visit:

**[www-gte.larc.nasa.gov](http://www-gte.larc.nasa.gov)**

For information about NASA on the Internet, visit:

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